SUMMER OF SCIENCE 2024

MATHEMATICS OF DERIVATIVE PRICING

PLAN OF ACTION

Timeline:

- Week 1: Introduction to Finance and some common terminology
- Week 2: Interest Rates - Simple and Compound, Cash Flow System: Future Value and Present Value
- Week 3: Bonds - Basics and Risks, Yield to Maturity, Macaulay Duration, Price Sensitivity Model
- Week 4: Derivatives, No cost forward pricing model, Futures
- Week 5: Swaps, Stocks: Effective Market Hypothesis, Binomial Lattice Model and Risk-Neutral Probability, Lognormal Model, Geometric Brownian Model
- MidTerm Report Submission (Late June)
- Week 6: Generalized Wiener Process, Monte Carlo Simulation, Ito Lemma
- Week 7: Options: Call and put, European and American, Premium Properties, Option Pricing Models, 1-step Binomial Model
- Week 8: Binomial Model, Discrete Time Step Model, Exotic Options, Conditional Expectation, Discrete Time Martingale, Fundamental Theorems of Asset Pricing
- Week 9: Black Scholes Model and Equation, The Greeks
- Week 10: Options Trading Strategies, Spreads - Bull, Bear, Butterfly
- EndTerm Report Submission (Late July)

References

- SI 527 Lectures and Slides - By Bhaskar S.
- D. G. Luenberger, Investment Science, Oxford University Press, 1998.
- J. C. Hull, Options, Futures and Other Derivatives, 4th Edition, Prentice-Hall, 2000
- J. C. Cox and M. Rubinstein, Options Market, Englewood Cliffs, N.J.: Prentice Hall, 1985
- C. P Jones, Investments, Analysis and Management, 5th Edition, John Wiley and Sons, 1996

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